

Hydromodification Management Plan

Revised Work Plan¹ (September 13, 2002)

A Hydromodification Management Plan (HMP) is required in Provision C.3.f. of the NPDES Permit issued to the Santa Clara Valley Urban Runoff Pollution Prevention Program (Program). The plan will focus on developing guidance to manage the hydrologic effects of new development and significant re-development on stream stability and geomorphology. The HMP is not intended to address water quality and habitat considerations explicitly, but these factors will be considered in evaluating and recommending control measures. The co-permittees, and staff from the Program and the Santa Clara Valley Water District (District) will cooperatively develop the HMP with the assistance of consultants and selected experts. The following describes the draft Work Plan and Schedule for developing the HMP.

Work Plan

The HMP Work Plan consists of the following tasks:

1. Develop Problem Statement and Goals
2. Review Literature and Data Source Availability
3. Characterize Stream Conditions and Future Development Patterns
4. Develop Conceptual Model of Processes Affecting Stream Stability
5. Select Assessment Method
6. Compile Available Data and Apply Assessment Method
7. Develop Guidance for Management Measures
8. Develop Implementation Strategy and Process for Continuous Improvement
9. Convene Expert Panel
10. Involve Public

Attachment A to the Work Plan contains a preliminary outline of the Management Practice Guidance Document, and Attachment B² contains the schedule for completion of tasks and deliverables.

The following describes each task. Where appropriate, the section in the permit provision addressed by the task is noted in parentheses.

¹ Draft approved by the SCVURPPP Management Committee on February 21, 2002. Revised draft approved by the HMP Work Group on September 6, 2002, as authorized by the Management Committee.

² Attachment B, Work Plan Schedule, will be updated in the near future to coordinate the efforts of consultants working for the Program and the Santa Clara Valley Water District on various HMP tasks.

Task 1 – Develop Problem Statement and Goals

Objective: Describe problem and goals.

Scope: The technical problem and regulatory background leading up this permit provision will be described, along with definitions for what hydro-modification means in the context of this effort. The goal of the plan will be described, along with supporting objectives. The process followed in developing the plan also will be described.

Product: Brief Technical Memorandum describing problem and goals.

Task 2 -- Review Literature and Data Source Availability (*Provision C.3.f.iv.1*)

Objective: Summarize relevant literature and data availability.

Scope: The scope of the literature review will support the total HMP development effort. The literature review will focus on the effects of urbanization on stream stability, the types of problems typically seen from hydromodification, the physical characteristics and processes that influence stream stability, assessment methods, and effectiveness of on-site and in-stream controls. The focus of the review will be on semi-arid conditions, but where information on semi-arid conditions is lacking, the review will include information for non-arid conditions. References will include relevant peer reviewed and other literature from local, regional, national, and international studies that may provide information to help address hydromodification in the Bay Area. Case studies within the Santa Clara Valley also will be reviewed to determine the types of conditions or perturbations that initiate instability, and the types of control measures that have been effectively applied to reduce instability or mitigate negative impacts. Other related projects in the Valley (e.g., USGS Rapid Sediment Budget Project on San Francisquito Creek) also will be reviewed.

This task will also include review of sources of available data for characterizing stream conditions and classifying stream reaches according to a range of levels of erosion potential (Task 3), developing the conceptual model (Task 4), and selecting and applying the assessment method (Tasks 5 and 6). Data types of interest include historical maps and aerial photographs, hydrologic information, stream channel conditions, geomorphology, sediment transport, stream restoration and flood control projects, and road crossing/culvert studies.

Product: A draft of the literature review will be prepared for review by the expert panel (see Task 9), the Program, and the District. The product of the literature review will include a database for individual references and a synthesis of the information by topic. A final draft of the literature review will be prepared, incorporating review comments, submitted to the Program Management Committee for approval, and then submitted to the Regional Board as part of the Program's FY 01-02 Annual Report by September 15, 2002.

Task 3 -- Characterize Stream Conditions and Future Development Patterns (*Provision C.3.f.ii*)

Objective: Develop and apply criteria to identify stream reaches that would be subject to plan provisions.

Scope: Based on current and historical information, supplemented with stream surveys, stream reaches will be characterized in terms of hydrologic and geomorphic conditions (e.g., flow frequency, channel type and geometry) and structural measures introduced (e.g., grade control structures, side slope stabilization). The characterization will likely include: watershed geology, soil type, and topography; sediment sources, erosional and depositional zones; and stream channel slope, stream type, flow magnitude, and bed material. At this point in the process, the characterization method will likely consist of review of existing information, maps, aerial photographs, and quick observational style field assessments. We also will identify where possible the extent to which stream conditions have been impacted by natural events (e.g., forest fires) and anthropogenic activities (e.g., mining and grazing). Stream segments will be classified as to stream type, potential for erosion and/or deposition, and other criteria, and will be identified and mapped using GIS.

Anticipated build-out development patterns (including areas of substantial infill) will be mapped and superimposed over the stream condition maps using GIS to determine the location of stream reaches likely to be subject to urban development. Based on this overlay, and criteria for defining erosion potential, non-exempt stream reaches potentially at risk will be identified. If the analysis exhibits any patterns, stream reaches will be classified into one of several “development/stream scenarios” based on specific conditions (e.g., upland steep slope streams subject to low density residential development, valley floor stream subject to commercial development) or subwatershed location (e.g., subwatershed A versus subwatershed B).

Sources of information for this task will include the District’s stream reach database; data and reports compiled by the Watershed Management Initiative including the land use analysis and projections conducted by Lucy Buchan for the WMI; and general plan maps from municipalities and the county showing potential build-out densities and storm drain maps.

Product: A technical memorandum will be developed on the results of this task for review by the expert panel, the Program, and the District.

Task 4 -- Develop Conceptual Model(s)

Objective: Identify important processes linking urbanization and stream morphology that should be considered in assessment.

Scope: A conceptual model (in the form of a graphic) of the processes that link urbanization to stream stability will be developed. The model will illustrate hydrologic

and geomorphic processes in watersheds and how processes are affected with development.. The intent of the conceptual model is to identify the important processes that would need to be captured in an assessment methodology, and also to be an educational tool that will help build consensus on the scope of the problem and overall approach.

Product: A graphic and supporting text of the conceptual model will be included with the Literature Review and reviewed by the Expert Panel and Program. A final draft of the conceptual model will be prepared, incorporating review comments and submitted to the Program and the Regional Board with the Literature Review.

Task 5 – Select Assessment Method

Objective: Evaluate options and select assessment tool.

Scope: An assessment tool will be needed to address the effects of urbanization on stream stability and to help identify the effectiveness of alternative control measures. The tool could range from empirical relationships between channel morphology and flow, creek walks and observational style assessments, to watershed-scale hydrologic and sediment transport modeling. A matrix will be developed that lists the advantages and disadvantages of alternative tools. The advantage and disadvantages of alternative assessment tools will be evaluated on the basis of comprehensiveness and scientific defensibility, level of detail, data needs and consistency with available data (determined from literature review), cost, and other factors. An assessment method will be selected based on these criteria. The method should be sufficiently comprehensive to quantify problems and evaluate alternative solutions that could be applied to address a wide variety of on-site and in-stream control measures. The assessment method will be used to identify where problems may occur and to evaluate the effectiveness of on-site and instream controls, as well as identify potential or required stream restoration segments.

The assessment method also will be selected to ensure that the following issues identified in Provision C.3.f. would be addressed:

- Applicable range of rainfall events (*Provision C.3.f.v.*),
- Instream erosion thresholds,
- Effects of urbanization on stream hydrograph change (*Provision C.3.f.iv.2.*),
- Cumulative impacts of urbanization (*Provision C.3.f.vi.1.*),
- Stream morphology (*Provision C.3.f.vi.2.*),
- Minimizing impervious surfaces (*Provision C.3.f.vi.3.*), and
- Stormwater detention, retention, and infiltration measures (*Provision C.3.f.vi.4.*).

It is anticipated that the assessment method would be applied to help develop design criteria and guidance on control options to meet the design criteria. The assessment method also would be an ongoing planning tool for the co-permittees that would be updated, maintained, and applied as new information is gained (e.g., finer resolution of stream conditions), or as conditions change.³

Product: Technical Memorandum Describing Available Assessment Methods, Selection Criteria and Process, and Chosen Assessment Method and Data Needs.

Task 6 -- Compile Available Data and Apply Assessment Method

Objective: Apply Assessment Method to various scenarios or watersheds and obtain information required to prepare the HMP in Tasks 7, 8 and 9.

Scope: The data required to apply the assessment tool would be compiled from various sources including the Watershed Management Initiative's Watershed Assessment Consultant, the Santa Clara Valley Water District, the USGS, San Jose State University, the City of Palo Alto, and other sources. Existing database formats will be reviewed and applied if applicable for the project.

The assessment method will be applied to one watershed (or subwatershed) to first test the method, prior to extension to other watersheds.

Product: A technical report will be developed on the results of this task for review by the expert panel, the Program, and the District.

Task 7 -- Develop Guidance for Selection, Sizing, Monitoring, and Maintenance of Management Practices (Provision C.3.f.iv.5, C.3.f.v, C.3.f.vi, C.3.f.vii)

Objective: Develop requirements and guidance for developers and agencies to guide selection and design of management practices.

Scope: The guidance for management practices will address requirements and recommendations for BMP selection and design with the objective of protecting stream channels downstream of a development area. Requirements will define levels of control; for example, extent to which post-development volumes must be retained on-site (hydrologic source control); or the extent to which in-stream flow levels and duration must conform to pre-development conditions. BMP selection and design guidance may include site planning, on-site hydrologic (and water quality) controls, in-stream controls, and regional facilities to accommodate the future development conditions. If the guidance is followed it is presumed, based upon the assessment results, that downstream channels

³ The District has recently submitted a concept proposal for Prop 13 grant funding to develop a regional approach to the treatment/control of stormwater runoff. The proposal includes development of a planning tool and computer model to optimize the selection and location of local and regional stormwater treatment systems. If this project is funded, it may be coordinated with and provide more resources for the development of the assessment tool for the HMP.

would be protected. The guidance also will address BMP inspection and maintenance requirements.

It is likely that the guidance will include BMP requirements that vary depending on various factors including the level of stream sensitivity, the size and nature of the development, and the feasibility and potential location of regional facilities. The level of detail of the guidance will take into account the availability of applicable existing BMP guidance and will likely incorporate some guidance by reference. The objective would be to avoid duplication of effort, but ensure that the guidance is tailored to Santa Clara Valley conditions. Guidance will likely also be tailored according to the audience; for example, specific guidance for plan reviewers may be necessary, whereas more technical guidance will be required for the developers' engineers. A preliminary outline of the guidance document is provided in Attachment A.

Products: This task will include development of the following products:

- a draft guidance document for expert panel, Program and District review;
- a draft HMP that incorporates the guidance document and the results of Tasks 1-6, for Program and District review and approval;
- a draft HMP for submittal to Regional Board staff;
- a final HMP for submittal to the Regional Board, incorporating comments of Regional Board staff and other interested parties.

Task 8-- Develop Implementation Strategy and Process for Continuous Improvement

Objective: Provide a road map for implementing the Plan.

Scope: The HMP will contain an implementation element that addresses the roles and responsibilities of the co-permittees, developers, and others in implementing the plan. Also since the HMP addresses an emerging issue for the co-permittees, it will be re-evaluated and continuously improved as experience is gained during implementation. The HMP will include a program evaluation element that addresses how information from inspections, monitoring, and other follow-up activities (e.g., developer surveys) will be re-evaluated and how the Plan would be revised.

Local implementation of the guidance will be addressed in individual Co-permittee annual work plans submitted as part of the Program's Annual Work Plan, which is submitted in March of each year, beginning March 1, 2003.

Product: Technical Memorandum describing implementation tasks, schedule, and responsible entities.

Task 9 -- Convene Expert Panel

Objective: Provide outside review to help ensure that HMP is scientifically defensible

Scope: An expert panel consisting of specialists in urban hydrology and water quality, fluvial geomorphology, stream restoration, botany, and aquatic ecology will be convened to review task products (including technical memoranda and the draft work plan) and participate as a team in conducting the work. Regional Board staff representatives also will be asked to participate, including staff associated with the Board's Stream Protection Policy. The schedule in Attachment B illustrates the time frames and topics for expert panel review.

Products: Summaries of review comments and responses.

Task 10 -- Involve Public

Objective: Obtain public input and ensure that Plan has public support.

Scope: The public will be involved through periodic presentations to the Watershed Assessment Subgroup (WAS) and Flood Management Subgroup (FMS) of the Santa Clara Basin Watershed Management Initiative, BASMAA's New Development Committee and other organizations, including the Home Builders Association (HBA) and development engineers. The Program's HMP Work Group and the BASMAA New Development Committee will have the opportunity to review draft work products and provide input during the same time period as the expert panel (see Attachment B).

Product: Meeting notes

ATTACHMENT A

**HMP Guidance Manual Outline
(Preliminary Draft)**

1. Introduction
2. Problem Definition and Goals
3. Manual Development Process
4. Description of Assessment Tool
5. Design Requirements
 - i. Storm Events to be Considered
 - ii. Threshold Stream Morphology Conditions
 - iii. Non-Exempt and Exempt Stream Segments
 - iv. Soil and Site Condition Limitations
 - v. Runoff Limitations
6. BMP Selection and Design Guidance
 - i. Site Planning
 - ii. On-Site Controls
 - iii. In- Stream Controls
7. Inspection and Maintenance Requirements
8. Monitoring Requirements
9. Implementation Guidance
10. Program Evaluation and Continuous Improvement